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Vol. 48 No. 3

BULLETIN

OF THE

TORREY BOTANICAL CLUB

MARCH, 1921

Neomillspaughia, a new genus of Polygonaceae, with remarks on related genera

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(WITH PLATE 1)

The genus *Campderia* Benth.* of the Polygonaceae was established in 1844, with the single species *C. floribunda*† from Tiger or Tigre Island, Gulf of Fonseca, Honduras, and was distinguished from *Coccoloba* by the fact that the perigone in fruit was not adherent to the achene. In the Genera Plantarum‡ it was maintained as a genus with two or three species, separated from *Coccoloba* by its accrescent calyx lobes and scarcely accrescent tube, all essentially free from the trigonous achene. In *Coccoloba* the perianth tube alone was said to be accrescent and often adnate to the globose or ovoid achene, In 1890, in his monograph of *Coccoloba*, Lindau§ referred *Campderia* to *Coccoloba* as a section containing thirteen species, distinguished from *Eucoccoloba* by its not elongating pedicels and by the fact that the limb and not the tube of the calyx is accrescent. There can be little question of the propriety of this arrangement. In habit and in all major characters except those mentioned *Campderia*, as exemplified by its type species and by those included in it by Lindau, agrees

[The BULLETIN for February (**48**: 55–76) was issued February 18, 1921.]

* Bot. Sulph. 159. *pl.* **52**. 1844.

† Bot. Sulph. 160. 1844.

‡ Benth. & Hook. Gen. Pl. **3**: 102. 1880.

§ Bot. Jahrb. **13**: 111, 121. 1890.

precisely with *Coccoloba*, and the differences indicated are so comparatively slight and so weakened by intergradient forms that they can not be considered of generic value.

Of the five species of *Campderia* described up to 1890, representing three valid species, all are accounted for by Lindau in his monograph of *Coccoloba*. A plant of very different characters, representing an undescribed genus, has more recently been described from Honduras by Donnell Smith* under the name *Campderia paniculata*, and with it is clearly to be associated another species from Yucatan described by Gross† in 1913 as *Podopterus emarginatus*. Both of these are shrubs or trees with orbicular leaves, cordate at base and strongly emarginate at apex. The inflorescence is a terminal panicle compounded of numerous slender racemes, the branches minutely scaly-bracted at base. Such an inflorescence is found in only two species of *Coccoloba*, forming the section *Paniculatae* of Meisner. It is in the perianth, however, that the chief distinguishing characters of this new genus appear. The tube is very short, and the five segments are in two distinct series; the three outer are distinctly winged from apex to base, and the wings are slightly decurrent on the pedicels. The two inner are flat, wingless, and shorter than the outer. In fruit all are somewhat accrescent, dry, and entirely free from the achene. In *Coccoloba*, on the other hand, the five perianth-segments are similar or subsimilar, more or less fleshy or coriaceous, in fruit flat or rarely slightly carinate but never winged, and usually adherent to the achene. The affinity of the new genus is clearly with *Podopterus* rather than with *Coccoloba*. From the latter it may be distinguished by its paniculate inflorescence, more narrowly winged perianth, and slightly winged scarcely elongated fruiting pedicels. In *Podopterus* the flowers are borne in dense fascicles at the tips of very short branchlets or in short axillary racemes, and the perianth and the fruiting pedicels are very strongly winged. The exact nature of the inflorescence in the type species of *Podopterus*, *P. mexicanus*, not clearly described by previous authors, deserves a word of explanation. The leaves are alternate and usually bear fascicles of two to four similar ones

* Bot. Gaz. **27**: 440. 1899.

† Rep. Nov. Sp. Fedde **13**: 218. 1913.

in their axils. After the fall of these leaves, the extremely abbreviated branchlet on which they were borne bears at its tip a dense fascicle of flowers. It is from the appearance of the old branches denuded of leaves and bearing numerous fascicles of flowers that Bentham's description of the inflorescence has been drawn. The inflorescence of the new species *P. guatemalensis* described below is precisely the same. In *P. cordifolius* Rose & Standley, however, the flowers are borne in short axillary racemes, 2–3 cm. long, often with a cluster of small leaves at the base, and as they are arranged in several successive axils and do not appear until after the fall of the primary leaves subtending them they simulate a panicle in appearance.

There is considerable diversity in the descriptions of the flower of *Podopterus* by different authors. Humboldt and Bonpland* in their original description ascribe to it six sepals, three outer and three inner, the outer being winged, the inner flattish and scarcely shorter than the outer. The stamens are described and figured as six, with subulate glabrous filaments, and the single ovule is said to be erect. Meisner's description† agrees essentially with theirs, with the added point that the ovule is subsessile. Bentham and Hooker's description‡ is taken largely from that of Humboldt and Bonpland, owing to their lack of complete material. The filaments are said to be filiform and the ovule subsessile. Baillon§ gives the number of sepals as five or six, the stamens as six to nine, with subulate filaments, and the ovule as stipitate. His figures show five sepals and eight stamens. Dammer,|| in the Pflanzenfamilien, gives the sepals as five, three outer and two inner, the stamens as eight, and the ovule as stipitate. In all the specimens I have examined (representing all the known species), with one exception, the sepals are five and the stamens eight, with subulate glabrous filaments; in a single flower of *P. cordifolius*, however, out of three examined, there were nine stamens. The seed has not yet been described, but fully mature fruits of *Podopterus mexicanus* collected by Pringle (No. 10181) at Tomellin Canyon,

* Pl. Aequin. **2**: 89. *pl. 107*. 1812.

† DC. Prodr. **14**: 171. 1856.

‡ Gen. Pl. **3**: 104. 1880.

§ Hist. Pl. **11**: 394. 1892.

|| Engler & Prantl, Pflanzenfamilien 3^{1a}: 32. 1892.

Oaxaca, May 14, 1906, and of *P. guatemalensis*, collected by Popenoe, enable me to give its characters.

The seed of *Podopterus mexicanus* is trigonous, either equal-sided or conforming to the shape of the achene (trigonous, with one side flat and two narrower and sulcate), and acute at apex. The plentiful albumen is farinaceous, slightly ruminate, and gives the starch reaction with iodine. The embryo is subcentral and straight, either flat or bent longitudinally in a boat-shaped fashion, when one half lies parallel to the flat side of the seed and the other enters the central lobe. The cotyledons are flat, or bent as described, and the radicle superior, slender, more than half as long as the thin oval cotyledons, ascending from their slightly cordate base. In young ovaries the ovule is erect and stipitate, as described by Baillon, not subsessile as described by Bentham and Hooker. In *P. cordifolius* the ovule is pendulous on a basal funicle longer than itself in the young flower. Older flowers of this species have not been examined.

In mature achenes of *Podopterus guatemalensis* the seed is trigonous, rounded on each side or with two sides slightly sulcate. The embryo is subcentral, in cross-section somewhat boat-shaped or bent in an irregular S-form. The oval cotyledons are unequal at base, oblique on one side and on the other cordate and accumbent to the base of the ascending radicle.

In 1901* Rolfe described and figured a new genus *Gymopodium* from British Honduras, said to be related to *Podopterus* but to be distinguished by its wingless pedicels and its nine stamens. Comparison with the description and specimens of the genus *Millspaughia* described several years later by Robinson† from Yucatan shows that the two genera are identical. The genus is not closely allied to *Podopterus*, however, as Rolfe considered it, probably on the basis of the tribal grouping in the Genera Plantarum, but is a near relative of *Antigonon* Endl., with which it was associated by Robinson.

Antigonon is placed by Bentham and Hooker in the tribe Coccolobeae, which is separated from the tribe Triplarideae, in which *Podopterus* is placed, chiefly by its five-parted perianth

* Hook. Icon. **27**: *pl. 2699*. 1901.

† Bot. Jahrb. **36** (Beibl. **80**): 13. 1905.

and usually eight stamens, while in the latter tribe the perianth is six-parted and the stamens, three, six, nine or many. As shown above, however, *Podopterus* is nearly always pentamerous in respect to its perianth and octandrous, the only specimens on record with hexamerous flowers being those from which the original description was drawn. Dammer describes the perianth of *Antigonon* as penta- or hexamerous, and figures it as hexamerous, but the normal number of perianth parts is certainly five, as given by Bentham and Hooker, and I have seen no specimens with six sepals. In his key to the tribe Coccolobeae, rightly including *Podopterus*, Dammer keys out *Antigonon* as having "Blh. [Blütenhülle] ohne Flügel," as opposed to the genera *Brunnichia* and *Podopterus* which have "Blh. mit Flügeln," but in his description of the genus he says "die 3 äusseren Blütenhüllb. bei der Fruchtreife . . . Flügel bildend." The distinction obviously intended is that in *Antigonon* the outer perianth segments lack dorsal wings and the tube is wingless, while one or both of these features are present in the two allied genera. The distinguishing characters between the genera considered above, with their close ally *Brunnichia*—including all the genera of the tribe Coccolobeae as defined by Dammer, with the exception of *Coccoloba* and *Muehlenbeckia*—may be expressed in the following key:

Perianth tube in fruit strongly accrescent, corky or coriaceous, longer than the limb, including the achene, one- or two-winged, the wings decurrent on the pedicel; perianth segments not winged; frutescent, climbing by tendrils; perianth segments five; stamens "five" to "nine," usually eight; ovule at first pendulous on a basal funicle about its own length, then erect; albumen six-sulcate by the intruded testa, otherwise not ruminate; embryo marginal, in one of the lobes, straightish. 1. *Brunnichia.*

Perianth tube scarcely accrescent in fruit, not corky or coriaceous, much shorter than the limb, not including the achene, wingless or three-winged.

Perianth segments without dorsal wings.

Perianth segments five, rarely "six;" filaments normally eight, united at base or to middle into a ring; ovule at first pendulous on a basal funicle slightly longer than itself, later erect; achene broadly ovoid, subterete below, sharply three-angled above, glabrous; embryo subcentral, flattish, the cotyledons not cordate at base; albumen strongly ruminate; plants woody only at base, climbing by tendrils. 2. *Antigonon.*

Perianth segments six; filaments normally nine (six outer, three inner), free; ovule erect from the first, on a stipe several times its length; achene ovoid-lanceolate, three-angled throughout, with sulcate sides, pubescent; embryo subcentral, somewhat boat-shaped, its cotyledons cordate and unequal at base, the radicle erect; albumen not ruminate; shrubs or trees, without tendrils, not scandent. 3. *Gymnopodium.*

Outer perianth segments with dorsal wings, the wings more or less decurrent on the pedicels.

Flowers in panicled racemes; perianth segments narrowly winged, the wings scarcely decurrent on the pedicels; filaments pubescent; albumen not ruminate. 4. *Neomillspaughia.*

Flowers in axillary fascicles or short axillary racemes; perianth segments broadly winged, the wings broadly decurrent on the pedicels; filaments glabrous; albumen ruminate. 5. *Podopterus.*

1. BRUNNICHIA Banks

With the exception of *Muehlenbeckia*, which is found in tropical America and in Australia, New Zealand, and the islands of the Pacific, *Brunnichia* is the only genus of the tribe Coccolobeae not confined to America. The type species, *B. cirrhosa* Gaertn., occurs in eastern North America, the three other known species coming from the region of the Belgian Congo and Camerun in western Africa. The genus may be divided into two sections, separated by habitat and by definite fruiting characters. In the section **Eubrunnichia**, sect. nov., including only the type species, *B. cirrhosa*, the tube of the perianth and the pedicel bear a single broad wing, and the perianth tube is much thickened and corky in fruit. In the African group, which may be called section **Dipteropodium**, sect. nov., the tube of the perianth and the pedicel bear two broad wings, and the perianth tube in fruit is coriaceous and not obviously thickened. This section includes three species, *B. africana* Welw. (type), *B. erecta* Aschers., and *B. congoensis* Dammer.* Of this group I have examined only a sheet of *B. africana* var. *glabra* Dammer, in the U. S. National Herbarium.

Brunnichia erecta Aschers. was originally described as an erect

* For an account of the African species, see Dammer, Bot. Jahrb. **26**: 347–357. 1899.

shrub without tendrils, but Dammer has found what he considers a young and undeveloped tendril in a specimen of this species, and states that all the specimens known are merely pieces from the region of the inflorescence, so that it is probable that this species agrees with the other better known members of the genus in the possession of tendrils.

The descriptions of the embryo given by Bentham and Hooker ("embryo in uno lobo leviter incumbenti-incurvus") and by Dammer, in the Pflanzenfamilien ("E. incumbent, einwärts gekrümmt Oll"), do not entirely agree with what I have found in the dissection of numerous seeds of *B. cirrhosa*. The albumen is six-sulcate by the intruded testa, otherwise not ruminate; the embryo is marginal in one of the lobes, straightish or very slightly incurved, and the radicle erect and in no way applied to the cotyledons. In all the specimens of the African species so far described the achenes, although in some apparently mature, have been empty of seed and filled with a fungal growth.

2. ANTIGONON Endl.

The perianth segments are given as five by Bentham and Hooker and by Baillon. Dammer, in the Pflanzenfamilien, gives them as five or six, and figures a flower of *A. leptopus* with six segments. I have seen no flower with six perianth parts, and believe this number must be very rare if not abnormal. The embryo, in the seeds examined, was subcentral, flat, and straight.

3. GYMNOPODIUM Rolfe, Hook, Icon. **27**: *pl. 2699*. 1901

Millspaughia Robinson, Bot. Jahrb. **36** (Beibl. **80**): 13. 1905.

The filaments in this genus are normally nine, as described by Rolfe, the six outer inserted at the outer edge of a short thickened somehat knobby disk at the base of the ovary, the three inner borne on this disk opposite the sulcate faces of the ovary. They are free, in which the genus differs from *Antigonon*, where an annulus of basally united filaments is always developed. The other characters by which *Gymnopodium* differs from *Antigonon* have already been indicated above. The ovule in *G. antigonoides* is erect on a funicle several times its length, not subsessile as described by Rolfe in *G. floribundum*. The three species now known may be distinguished by the following key:

Leaves glabrous. 1. *G. floribundum.*
Leaves pubescent at least when young.
Leaves obovate or oval, obtuse or rounded; outer perianth segments cordate at base. 2. *G. antigonoides.*
Leaves ovate or broadly ovate, acutish; outer perianth segments not cordate at base. 3. *G. ovatifolium.*

1. GYMNOPODIUM FLORIBUNDUM Rolfe, Hook. Icon. **27**: *pl. 2699.* 1901

Millspaughia leiophylla Blake, Contr. Gray Herb. n. ser. **52**: 62. 1917.

Originally described from specimens collected on pine ridges at Manatee, British Honduras, by E. J. F. Campbell (No. 60). The specimens from which *M. leiophylla* was described were collected in swampy saline ground at Manatee Lagoon, British Honduras, by M. E. Peck (No. 320).

2. **Gymnopodium antigonoides** (Robinson) Blake, comb. nov.

Millspaughia antigonoides Robinson, Bot. Jahrb. **36** (Beibl. **80**): 14. 1905.

This species has hitherto been known only from Yucatan, but is also represented by specimens in the National Herbarium collected at Tuxtla Gutierrez, Chiapas, on March 8, 1904, by E. A. Goldman (No. 743).

3. **Gymnopodium ovatifolium** (Robinson) Blake, comb. nov.

Millspaughia ovatifolia Robinson, Bot. Jahrb. **36** (Beibl. **80**): 14. 1905.

Known only from Yucatan. Not examined by the writer in the present connection.

4. NEOMILLSPAUGHIA Blake, gen. nov.

Shrubs or trees; leaves alternate, orbicular, cordate at base, emarginate at apex, short-petioled, with deciduous ocreae; panicles terminal, compounded of racemes; peduncles of the racemes with small scarious bracts at base; ocreolae two- to six-flowered; pedicels filiform, narrowly three-winged toward apex, not lengthened in fruit, jointed much below the middle; perianth petaloid in flower, in fruit dry and accrescent, the tube very short, the three outer segments ovate or oval-ovate, winged throughout,

the wings decurrent on the upper part of the pedicel, more or less erose, the two inner segments oval-ovate or oval, plane, wingless, obtuse, slightly shorter than the outer; stamens eight or nine, the filaments inserted on the base of the perianth, united at base, subulate from a lance-ovate base, pubescent about to middle, the anthers suborbicular, dorsified in the middle, the cells free except at the point of attachment; ovary trigonous, glabrous, the ovule erect, subsessile; styles three, slender, with irregular capitate stigmas; achene trigonous-ovoid, acutish, with flat sides, the more or less persistent styles slightly exserted between the wings of the perianth; seed trigonous, one side flattish, the others sulcate; albumen not ruminate; embryo subcentral, straight, the superior radicle shorter than the suborbicular somewhat boat-shaped cotyledons.

Type species, *Campderia paniculata* Donn. Sm.

As *Millspaughia* Robinson has proved to be a synonym of *Gymnopodium*, the present genus may appropriately take the name *Neomillspaughia*, in honor of Dr. C. F. Millspaugh, botanical curator of the Field Columbian Museum, who has done so much to increase our knowledge of the flora of Yucatan.

Leaves 9–16 cm. wide, beneath rather densely sordid-puberulous; fruiting perianth 4.5 mm. long; achene 3 mm. long. 1. *N. paniculata.*

Leaves 4.5–9 cm. wide, beneath glabrescent except along the costa and the chief lateral veins; fruiting perianth 8 mm. long; achene 3.5 mm. long. 2. *N. emarginata.*

1. **Neomillspaughia paniculata** (Donn. Sm.) Blake, comb. nov.

Campderia paniculata Donn. Sm. Bot. Gaz. **27**: 440. 1899.

Known only from the type collection by C. Thieme (distr. Donn. Sm. No. 5604), from the Río Chamelecón, Department Santa Barbara, Honduras, altitude 500 meters, December, 1888.

2. **Neomillspaughia emarginata** (H. Gross) Blake, comb. nov.

Podopterus emarginatus H. Gross, Rep. Nov. Sp. Fedde **12**: 218. 1913.

This species was based on fruiting specimens collected in July in woods near Kabah, Yucatan, by Seler (No. 5600), and on flowering specimens collected near Izamal, Yucatan, July, 1895, by G. F. Gaumer (No. 750). Only the latter collection has been examined. This is said to be from a tree 15 meters (50 feet) high, common in forests and brush lands near Izamal.*

* Millsp. Field Col. Mus. Bot. **1**: 294. 1896, under *Podopterus mexicanus.*

5. PODOPTERUS Humb. & Bonpl. Pl. Aequin. **2**: 89. *pl. 107.* 1812*

The characters of this genus have been indicated with sufficient detail in the discussion and key given above. The three species now known may be separated by the following key.

Flowers in fascicles; leaves obovate or oval-obovate.
 Leaves glabrous beneath or merely pilosulous at base of midrib, acute at base. 1. *P. mexicanus.*
 Leaves rather densely pilosulous on the surface as well as the veins beneath, rounded or cordate at base. 2. *P. guatemalensis.*
Flowers in short axillary racemes; leaves oval-ovate or ovate, cordate at base. 3. *P. cordifolius.*

1. PODOPTERUS MEXICANUS Humb. & Bonpl. Pl. Aequin. **2**: 89. *pl. 107.* 1812

The type of this species came from the State of Veracruz, between Veracruz and La Antigua. No material from Veracruz is in the National Herbarium, but the species is represented from Tamaulipas, Yucatan, Oaxaca, and also from Armeria, Colima, on the western coast, where it was collected by Palmer in 1891 (No. 1290).

Podopterus mexicanus was originally described and figured as having six perianth segments, six stamens, and leaves slightly hairy at base. In the later description of Kunth† the leaves and petioles were said to be glabrous. I have already discussed the question of the number of floral parts. It may noted that none of the specimens examined has leaves or petioles which can be called glabrous, there being always some pubescence at least on the margin of the petiole, which is sparsest in the two collections from Oaxaca now before me, and usually also at the base of the costa beneath. Dr. H. Lecomte, to whom I sent specimens for

* The date given for this name is taken from Sherborn & Woodward's paper on the dates of Humboldt and Bonpland's Voyage, Jour. Bot. **39**: 203. 1901. The page reference, which is the only one I have seen cited, has been verified for me by Dr. J. H. Barnhart. In the Library of Congress copy of this work *Podopterus* and *P. mexicanus* are published on p. 82, and another reference which I have had occasion to look up shows a similar discrepancy (p. 132 instead of the usually cited 139 for *Rhaptostylum*). It is evident that there were two editions of this work, both in folio, a fact which seems to have escaped the notice of bibliographers.

† H. B. K. Nov. Gen. et Sp. **2**: 181. 1817.

comparison, informs me that there are now no leaves on the specimens in the Paris Herbarium.

2. **Podopterus guatemalensis** Blake, sp. nov.

Shrub or tree; branches somewhat zigzag, with short internodes and spinescent branchlets, gray-barked and densely spreading-puberulous, becoming purplish-fuscous and glabrate; leaves in clusters of two to four; petioles densely sordid-pilosulous with loosely spreading hairs, 4–15 mm. long; blades broadly obovate or oval-obovate, 2.2–4.3 cm. long, 1.8–3.2 cm. wide, broadly rounded or obtuse, sometimes slightly emarginate, narrowed to a rounded or cordate base, coriaceous, above dull green or in age somewhat shining, along costa densely pilosulous, on surface essentially glabrous or sparsely spreading-pilosulous and glabrate, beneath dull green, along costa densely spreading-pilosulous, on surface densely, permanently, and sordidly spreading-pilosulous with loose hairs or sparsely so and subglabrate, finely prominulous-reticulate on both sides, the chief lateral veins about six pairs; fascicles many-flowered, on usually leafless branches; pedicels glabrous, 12–17 mm. long, winged for half their length or more, about 4.5 mm. broad at base of calyx; calyx in fruit 8 mm. long, glabrous, the three outer segments with a wing 2 mm. wide, the two inner ovate, obtuse, cucullate, 5 mm. long; stamens eight, the filaments glabrous, subulate; achene trigonous-ellipsoid, obtusish at each end, 5 mm. long, 2.5 mm. wide, flat or rounded on one side, sulcate on the others, pale brownish; styles three, spreading, 1 mm. long.

TYPE in the U. S. National Herbarium, No. 1038152, collected at Barranquillo, Department El Progreso, Guatemala, altitude 550 meters, March 15, 1920, by Wilson Popenoe (No. 973).

The following specimens have likewise been examined:—

GUATEMALA: El Rancho, Department Jalapa, March 10, 1905, *Kellerman 4994*.

The vernacular name of this species is given by Mr. Popenoe as "cruzito."

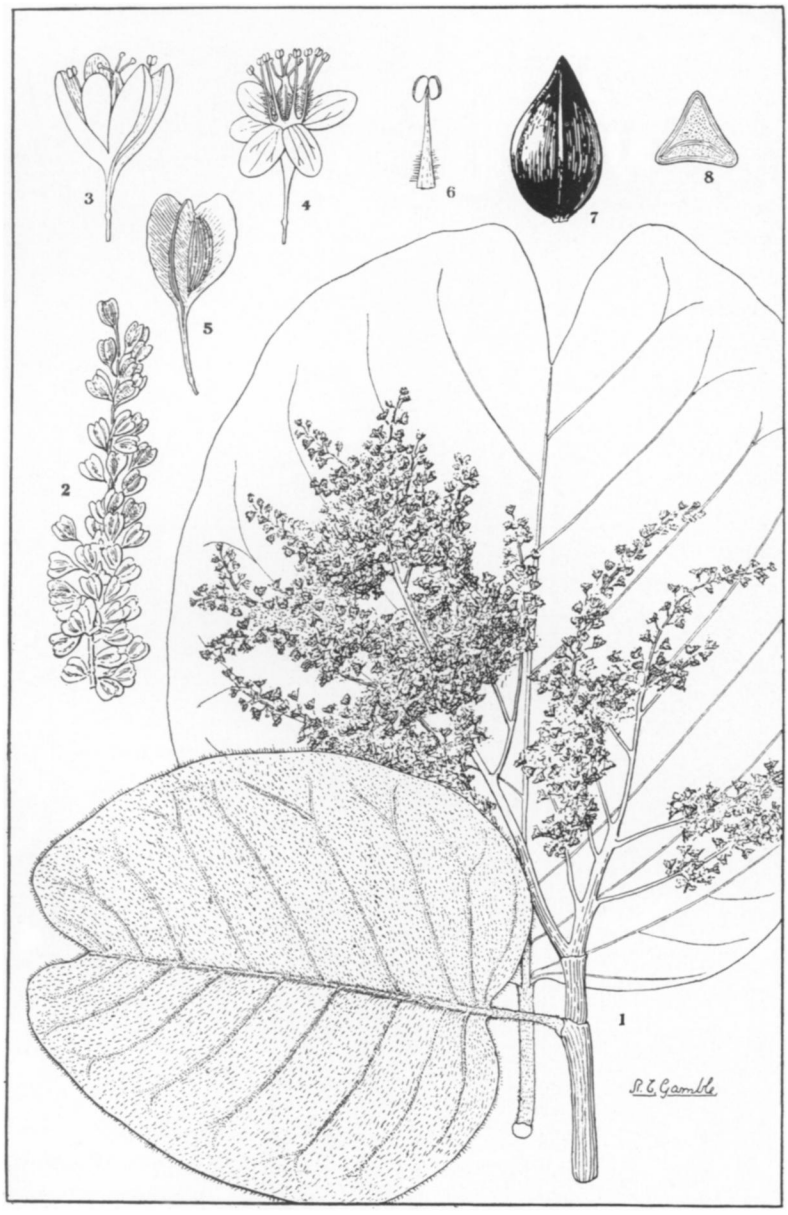
3. PODOPTERUS CORDIFOLIUS Rose & Standl. Proc. Biol. Soc. Washington **33**: 66. 1920

Originally described from a collection made by M. E. Jones (No. 103) at Manzanillo, Colima, on June 25, 1892. A specimen collected by C. R. Orcutt (No. 3306) at Tehuantepec, Oaxaca, on April 19, 1910, is also in the U. S. National Herbarium.

Explanation of plate 1

NEOMILLSPAUGHIA PANICULATA (Donn. Sm.) Blake

FIG. 1. Inflorescence and leaves, about 4/5 natural size.
FIG. 2. Portion of fruiting raceme, about natural size.
FIG. 3. Flower, about × 3½.
FIG. 4. Flower opened, about × 3½.
FIG. 5. Fruit, about × 3.
FIG. 6. Stamen, about × 5.
FIG. 7. Achene, about × 7.
FIG. 8. Achene in transverse section.



NEOMILLSPAUGHIA PANICULATA (DONN. SM.) BLAKE